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Dated: July 21, 1993.

Cary Green,
Director, Information Resources Management Service.

Office of Elementary and Secondary Education

Type of Review: Reinstatement
Title: Comparability of Services Requirement—Section 201.44 of the Code of Federal Regulations—Information Collection to Document Compliance

Frequency: Annually

Affected Public: State or local governments

Reporting Burden:

Responses: 0

Burden Hours: 0

Recordkeeping Burden:

Recordkeepers: 2,051

Burden Hours: 4,153

Abstract: Operating agencies are required to provide services to students receiving Migrant Education Program Services who are at least comparable to those received by other students. States are required to monitor compliance with this requirement. To document compliance, a reporting and recordkeeping burden is imposed on SEAs and LEAs. The Department will use the information of ascertain compliance with § 201.44 of the Code of Federal Regulations.

Office of Educational Research and Improvement

Type of Review: Extension

Title: Application for Grants Under the Fund for the Improvement and Reform of Schools and Teaching (FIRST): Schools and Teachers Program/Family-School Partnership

Frequency: Upon completion of project—12 to 36 months

Affected Public: State and local governments; Non-profit institutions

Reporting Burden:

Responses: 800

Burden Hours: 11,527

Recordkeeping Burden:

Recordkeepers: 0

Burden Hours: 0

Abstract: Applications are required to receive grants under the FIRST program. Program participants include LEAs, SEAs, IHEs, nonprofit organizations, individual public and private schools, consortia of individual schools, and consortia of these schools and institutions.

Office of Educational Research and Improvement

Type of Review: Revision

Title: Schools and Staffing Survey

Frequency: Triennial

Affected Public: Individuals and households; State or local governments; Non-profit institutions

Reporting Burden:

Responses: 9,000

Burden Hours: 3,000

Recordkeeping Burden:

Recordkeepers: 0

Burden Hours: 0

Abstract: The Schools Staffing Survey is an integrated set of surveys consisting of the Teacher Demand and Shortage Survey, the School Survey, the School Administration Survey, and the Teacher Survey. The purpose of these surveys is to measure critical aspects of teacher supply and demand, the composition of the administrator and teacher work force, and the general status of teaching and schooling.

Office of Special Education and Rehabilitative Services

Type of Review: Revision

Title: Report of Infants and Toddlers Receiving Early Intervention Services in Accord with Part H

Frequency: Annually

Affected Public: State or local governments

Reporting Burden:

Responses: 58

Burden Hours: 2,393

Recordkeeping Burden:

Recordkeepers: 0

Burden Hours: 0

Abstract: This collection requirement provides instructions and forms for States to report the number of infants and toddlers with disabilities receiving early intervention services and serves as the basis for monitoring, implementing Federal programs and reporting to Congress.

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DEPARTMENT OF ENERGY

Office of Policy, Planning, and Program Evaluation; Guidelines for Voluntary Reporting of Greenhouse Gas Emissions and Reductions, and Carbon Sequestration

AGENCY: U.S. Department of Energy (DOE).

ACTION: Notice of inquiry and request for comment.

SUMMARY: Pursuant to Section 1605(b) of the Energy Policy Act of 1992, the Department of Energy (DOE) is developing guidelines for the voluntary reporting of greenhouse gas emissions, their reduction, and carbon fixation achieved through any measure. The data will be reported on forms to be developed by the Energy Information Administration (EIA) and added to an EIA database.

Because of the potential broad public interest in the issues involved, DOE believes that the public should have an opportunity to provide input on the issues raised in the voluntary reporting program in advance of the proposal of the guidelines. DOE is requesting written comments as one means to bring a broad range of views into the guideline development process.

Subsequent to analysis of the submissions made in response to this notice, DOE contemplates scheduling, in consultation with the Environmental Protection Agency (EPA), a limited number of public workshops prior to releasing proposed guidelines for public comment. Each workshop would focus on a specific area, inviting the stakeholders for a technical discussion on the issues in that area. This process will help ensure that proposed guidelines address concerns so identified. The proposed guidelines themselves will be subject to public notice and comment prior to final issuance.

DATES: Written submissions are due on or before August 26, 1993. Comments should be submitted in quadruplicate.

ADDRESSES: Written comments should be submitted to Ms. Jean Vernet, Office

of Environmental Analysis (PO-60), U.S. Department of Energy, 1000 Independence Ave SW, Washington, DC 20585.

FOR FURTHER INFORMATION CONTACT: Ms. Jean Vernet, at the address above, or by telephone at (202) 586-4755.

SUPPLEMENTARY INFORMATION: Under Section 1605(b) of the Energy Policy Act of 1992 (EPACT; Pub. L. 102-486), the Secretary of Energy with the Energy Information Administration (EIA) is to establish a voluntary reporting system and database on emissions of greenhouse gases (GHGs), reductions of these gases, and carbon fixation. Appropriate consultation with EPA is required under sec. 1605(c). This notice is directed at obtaining information that will be useful in developing the guidelines for the voluntary reporting program required under sec. 1605(b)(1). Under companion provisions of sec. 1605, EIA is to prepare a national aggregate inventory of GHG emissions, and develop reporting forms and a database for the voluntary reporting system.

I. Background

Section 1605(b)(1) of EPACT requires that the Secretary of Energy issue, after opportunity for public comment, guidelines for the accurate voluntary collection and reporting of information on greenhouse gas emissions for a baseline period of 1987 to 1990 and subsequent years; annual GHG emissions reductions and carbon fixation; GHG emissions reductions specifically achieved as a result of voluntary reductions, plant or facility closings and state or Federal requirements; and an aggregate calculation of greenhouse gas emissions by each reporting entity. Subsections 1605(b) (2) and (4) further require that the Administrator of the EIA develop forms and a database for voluntary reporting under the guidelines. Subsection 1605(b)(4) also recognizes that the data may be used by the reporting entity to demonstrate achieved reductions of GHGs.

The statutory language identifies some specific GHG reduction and carbon sequestration activities that the program must cover but leaves discretion in both technical and policy areas, including those discussed below. A further discussion of the areas is contained in the appendix to this notice to aid in developing comments.

DOE recognizes that the design of the voluntary reporting program will greatly affect participation in the program, as well as the credibility and usefulness of data reported, including its use in

demonstrating achieved reductions. DOE therefore specifically asks that respondents address the impact of any suggested approach(es) on the degree of participation by potential reporting entities, as well as on the credibility of both the individual data reported and the reporting system as a whole.

II. Request for Submissions

DOE requests written comments on all aspects of the program from interested parties, especially those with particular knowledge in the institutional, legal, and technical areas related to reporting GHG emissions, their reduction, and carbon fixation. All written information provided by respondents will be available for public inspection at the Department of Energy, Freedom of Information Reading Room, room 1E-190, 1000 Independence Avenue, SW., Washington, DC 20585, between the hours of 9 a.m. and 4 p.m., Monday through Friday, except Federal holidays. Pursuant to provisions of 10 CFR 1004.11 (1983), any person submitting information believed to be confidential and exempt by law from public disclosure should submit one copy only of the document and, if possible, 4 additional copies in which information believed to be confidential has been deleted. The Department of Energy will determine the confidential status of the information and treat it accordingly.

Some specific areas for comment are identified below; however, these areas are not intended to limit the content of submissions. While DOE recognizes that issues in the voluntary reporting program are highly diverse, they are grouped into two main categories, Institutional and Technical, to aid in presentation.

Institutional Issues

- To determine what constitutes the "reporting entity," discuss the appropriate legal structure(s) to identify and define, for the purpose of the program, both the reporting entity and reportable activity. Possible candidates for "entity" include the firm, parent company, subsidiary company, the facility, the emitting unit, and an individual person.
- Discuss the appropriateness of setting a *de minimis* reportable level of emissions, emissions reduction, or carbon sequestered; and *de minimis* level(s) appropriate for each gas and/or activity. Actions that by themselves emit or achieve such small levels of GHG reduction may not logistically be dealt with under the program.
- Discuss methods to identify appropriate reporting entities in

multiple-party activities that reduce emissions or fix carbon.

- Discuss methods to address indirect causes of GHG emissions reductions; for example, when energy efficiency improvements in the residential and commercial sector result in decreased electricity production demand and subsequent decreased GHG emissions at the generating plant.

- In addition to using an historical baseline (for example, 1990 or the year immediately preceding the reduction activity), discuss the appropriateness of further defining baseline as projected emissions without the reduction activity (that is, including GHG emissions prevention as well as actual reductions).

- Discuss methods to address a reporting entity's emissions reductions that occur through shifting an activity and the accompanying emissions outside the reporting entity.

- Discuss factors that are particular to emissions reduction and carbon fixation actions taken by U.S. entities outside the U.S., for example, different verification techniques.

- Identify other State, Federal, or private reporting mechanisms for information similar to, or from which the reporting entity may derive, data used by the voluntary reporting system on GHGs emissions, emissions reductions, and carbon fixation.

- Discuss use of a reporting system to encourage and recognize reporting entities for achievement of emissions reduction goals.

- Discuss the balance between the cost of estimation methods and their relative accuracy.

- Discuss mechanisms for the reporting entity to verify the data reported; discuss how the design of the guidelines can promote accuracy; and discuss whether the reporting system should categorize data reported by degree of uncertainty or verification.

- Propose specific issue areas and groupings for workshops that would be useful in guideline design.

Technical Issues

- In addition to those GHGs specifically mentioned in sec. 1605(b), (CO₂, CFCs and methane), identify any additional GHGs that the voluntary program may cover and the rationale for including each in the program. For example, does the nature of the gas and its sources offer opportunities for reductions that could be reported?

- Discuss ways in which differences in radiative activity among the GHGs could be treated in the guidelines. Given the changing scientific understanding and continuing scientific refinement in this area, discuss the benefits of (a)

addressing radiative activity and global warming potential in reference documents for the use of the reporter or (b) requiring submission of reported emissions data reduced to common radiative factors provided in the guidelines.

- Identify existing protocols and techniques for measuring and estimating emissions, emissions reductions, and carbon fixation; discuss their suitability for use in the voluntary reporting system. For example, international protocols for estimating national total emissions of GHGs (currently under development) are not necessarily designed to accommodate individual activity estimations.

- Identify those prevalent GHG emissions reduction and carbon fixation activities that are likely to be reported, together with methods to quantify the resulting GHG or carbon effect of the activity.

- Identify any additional sectors not discussed in the appendix that the guidelines should address, identifying the GHG-emitting and emissions reduction activities, with methods for estimating GHG emissions and reductions. The major sectors discussed in the appendix are electric utility, residential and commercial, industrial, transportation, and agriculture and forestry.

- For the Electric Utility Sector, discuss calculating and estimating GHG emissions and reductions through activities such as more energy-efficient electricity generation, new technologies, fuel switching and pre-combustion treatment, cogeneration, equipment upgrade, conservation, and demand-side management programs.

- For the Residential and Commercial Sector, discuss estimating emissions and emissions reductions from energy sources other than electricity.

- For the Industrial Sector, specifically address emissions of CFCs and methane from industrial activities and the substitution of technologies in heat and mechanical applications.

- For the Transportation Sector, discuss estimating GHG emissions and reductions achieved through activities such as improved fuel efficiency, use of lower GHG-emitting fuels, and changes in public transit ridership and total personal vehicle use.

- For the Forestry and Agriculture Sector, discuss categorization and quantification of various forestry and agricultural activities by their potential for carbon fixation and storage; activities that increase biomass production, conservation, and biomass technology substitution for other fuel use; and practices in livestock

production and fertilizer use that impact GHG emissions.

Respondents are invited to submit any additional information that they believe relevant to guideline development.

Issued in Washington, DC on July 20, 1993.

Susan F. Tierney,

Assistant Secretary, Office of Policy, Planning, and Program Evaluation.

Appendix

This appendix provides additional background information and technical detail regarding issues related to development of the guidelines for the voluntary reporting program. DOE seeks comment and discussion on every aspect of the proposed guidelines; the additional information provided is not intended to limit subject areas or approaches that may be addressed in the written comments.

The request for submissions identifies two general categories of issues: Institutional and Technical; this appendix follows a similar format. The institutional category includes issues related to defining the reporting entity and its baseline emissions, activities undertaken jointly by reporting entities, international activities, the scope and credibility of the program, the accuracy of reports of emissions reductions and carbon sequestration, and the categorization of reports by motivation. The technical issues relate to identification of gases covered by the program, comparisons among gases, identification and treatment of specific activities, and identification of information needed for possible federal recognition of voluntary reductions. Emissions reduction and carbon sequestration activities are further categorized into five sectors: electric utility, residential and commercial, industrial, transportation, and agriculture and forestry.

Institutional Issues

Defining the Baseline

Section 1605(b)(1) specifies the baseline period of 1987 through 1990 (the "historic baseline"), but does not specify the benchmark relative to which emissions reductions and carbon sequestration are to be measured.

Several approaches could be adopted for the guidelines. The guidelines might require that all emissions reductions be reported relative to the reporting entity's historic baseline. For this approach, the baseline could be further defined as the highest, lowest, or average of the annual emissions from 1987 to 1990. Baseline for reduction activity, moreover, could be the emissions level immediately preceding the reduction activity.

The use of the historic baseline raises concerns about the treatment of newly formed reporting entities or those with growing emissions. Reasons for an increase in an entity's emissions include mergers and acquisition, increased production, and general economic growth. Alternatives to use of historic baselines include (a) measuring the reduction relative to an estimated level of emissions without the reduction activity, (b) reporting reductions in GHG emissions per unit of production output, or (c) reporting on a project or activity basis.

Defining the Reporting Entity and Reportable Activity

One critical element in establishing the baseline is the definition of the scope or boundaries of the reporting entity. If the reporting entity is not well defined, reductions can be achieved by shifting emitting activities from one subsidiary to another or by shifting certain activities to subcontractors.

If emissions reductions are reported on a project-by-project basis, then the project baseline may reflect what would have happened had the project not been undertaken. This might be accomplished, for example, through the use of reference cases or extrapolation from past trends.

Joint Activities

Many activities that reduce GHG emissions and increase carbon fixation will involve more than one party. For example, a conservation program under which an electric utility subsidizes the purchase of high efficiency refrigerators by residential customers involves the utility, the homeowners, and the appliance manufacturer. The guidelines may include methods to determine which entity may report the reductions.

International Activities

Section 1605 does not limit reportable emissions or reductions to those occurring within the U.S. Thus, the guidelines may address both the applicability of the program to, and appropriate methods addressing factors specific to, activities occurring outside the U.S. Examples of potentially reportable existing international activities include forestry projects in developing nations and energy efficiency improvement projects in countries-in-transition.

Balancing Scope and Credibility of Program

The level of specificity in the guidelines and reporting program can affect the level of participation, the credibility of the data reported, and the

potential for recognizing reported reductions achieved. GHG emissions data for some activities are well documented, for others less complete. Also, for any given area of activity, several different methods may be used to estimate the accomplishments of the reporting entity. The choice of methods involves achieving a balance between containing the costs of reporting the activity and increasing the credibility of the estimate.

An issue for the program is how to deal with varying levels of confidence in estimations of emissions, emissions reductions, and carbon sequestration. Alternative methods to address this issue include categorizing reports according to the level of uncertainty, and allowing reporting entities to choose from a menu of methods for estimating emissions reductions or carbon sequestration.

Identifying Motivation for Reductions

Section 1605(b)(1)(C) requires that the guidelines must identify reductions achieved as a result of (1) voluntary reductions, (2) plant or facility closings, and (3) state or Federal requirements. Motivation for voluntary reductions may include, for example, energy cost savings or participation in a federal environmental recognition program. These categories may not be mutually exclusive. For example, a firm may elect to comply with state or Federal regulations by closing, rather than upgrading, an existing facility. The reporting program may address appropriate allocation of reduction registrations by motivational category to prevent double counting.

Accuracy and Credibility of Reports

Section 1605(b)(2) provides that entities reporting under the voluntary program must certify the accuracy of the information reported but does not require independent verification or auditing. However, DOE recognizes the importance of maintaining the

credibility of the database. The guidelines may address mechanisms available to reporting entities that promote the accuracy of individual reports. These mechanisms might include the use of records already maintained by the reporting entity, related reports provided to state or Federal regulatory agencies, or private monitoring or auditing of the reported data.

Technical Issues

Technical issues relate to coverage of the program, comparisons among gases, and GHG emissions reducing and carbon sequestering activities in each of five sectors.

Coverage of Program

EPACT does not define those greenhouse gases to be covered by the voluntary reporting program. Only three types of gases are specifically mentioned in sec. 1605 relative to reportable activities: carbon dioxide, methane, and chlorofluorocarbons.

Guidance in developing the list of greenhouse gases to be covered by the program may be found outside the legislative language. The United Nations Framework Convention on Climate Change, for example, defines greenhouse gases as "those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation." This broad definition would include, for example, water vapor. The Intergovernmental Panel on Climate Change (IPCC) has produced a list of greenhouse gases, illustrated in Tables 1 and 2 (included in the discussion of comparisons among gases). However, only six types of GHGs are actually listed by the IPCC: carbon dioxide, methane, nitrous oxide, carbon monoxide, nitrogen oxides, and the halogenated substances. The latter category includes not only chlorofluorocarbons, but also the

hydrochlorofluorocarbons and hydrofluorocarbons.

Each of these substances may warrant more or less attention in the guidelines, depending upon the level of anthropogenic emissions, the extent of opportunities to reduce emissions, and their relative radiative activity and atmospheric lifetimes.

Accounting for Differences Among Gases

Section 1605(b)(1) also requires that the guidelines "establish procedures for taking into account the differential radiative activity and atmospheric lifetimes of each greenhouse gas." Human activities affect several of the greenhouse gases, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and halogenated substances. Emissions of other gases, including carbon monoxide (CO), nitrogen oxide compounds (NO_x), and the non-methane hydrocarbons (NMHC) group, also result from human activity and affect the concentration of greenhouse gases. Some scientists believe that the presence of sulfur aerosols tends to cool the surface of the earth, making the emission of sulfur dioxide (SO₂) also of interest in the climate change issue.

The IPCC has attempted to compare the relative radiative forcing of these gases, although computing quantitative measures has proven difficult. In 1990, the IPCC provided estimates of direct and indirect effects of the release of one kilogram of each gas, relative to the release of one kilogram of CO₂; a measure termed "global warming potential (GWP) coefficient." Because gases are eliminated from the atmosphere at different rates, the GWP calculation varied depending upon the length of the period in which the cumulative change in radiative forcing was computed. GWP coefficients were provided in 1990 for each gas based on time horizons of 20, 100, and 500 years (Table 1).

TABLE ONE.—VALUES OF GLOBAL WARMING POTENTIAL AS USED BY THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) IN 1990

Trace gas	Global warming potential		
	Integration time horizon (yrs)		
	20	100	500
Direct Effects:			
Carbon dioxide	1	1	1
Methane (incl. indirect effects)	63	21	9
Nitrous oxide	270	290	190
CFC-11	4500	3500	1500
CFC-12	7100	7300	4500
HCFC-22	4100	1500	510
CFC-113	4500	4200	2100

TABLE ONE.—VALUES OF GLOBAL WARMING POTENTIAL AS USED BY THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) IN 1990—Continued

Trace gas	Global warming potential		
	Integration time horizon (yrs)		
	20	100	500
CFC-114	6000	6900	5500
CFC-115	5500	6900	7400
HCFC-123	310	85	29
HCFC-124	1500	430	150
HFC-125	4700	2500	860
HFC-134a	3200	1200	420
HCFC-141b	1500	440	150
HCFC-142b	3700	1600	540
HFC-143a	4500	2900	1000
HFC-152a	510	140	47
CCl ₄	1900	1300	460
CH ₃ CCl ₃	350	100	34
CF ₃ Br	5800	5800	3200
Indirect Effects			
CH ₄ effect on tropospheric O ₃	24	8	3
CH ₄ as CO ₂	3	3	3
CH ₄ as stratospheric H ₂ O	10	4	1
CO effect on tropospheric O ₃	5	1	0
CO as CO ₂	2	2	2
NO _x effect on tropospheric O ₃	150	40	14
Non-methane hydrocarbons as tropospheric O ₃	28	8	3
Non-methane hydrocarbons as CO ₂	3	3	3

In 1992, IPCC revised these estimates, but difficulties arose in uniquely defining a GWP for all effects of short-lived gases such as CO, NO_x, and CH₄. Therefore, IPCC reported only direct GWP coefficients, acknowledging that problems associated with the removal rate of CO₂ led to the potential biases even in the direct GWP coefficients published (Table 2).

TABLE TWO.—VALUES OF GLOBAL WARMING POTENTIAL AS USED BY THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC) IN 1992

Gas	Life (years)	Direct effect for time horizons of			Signs of "indirect" effect
		20 years	100 years	500 years	
CO ₂	(1)	1	1	1	None ² .
CH ₄	10.5	35	11	4	Positive.
N ₂ O	132	260	270	170	Uncertain.
CFC-11	55	4500	3400	1400	Negative.
CFC-12	116	7100	7100	4100	Negative.
CFC-13	400	11000	13000	15000	Negative.
CFC-14	>500	>3500	>4500	>5300	None.
HCFC-22	15.8	4200	1600	540	Negative.
CFC-113	110	4600	4500	2500	Negative.
CFC-114	220	6100	7000	5800	Negative.
CFC-115	550	5500	7000	8500	Negative.
CFC-116	>500	>4800	>6200	>7200	None ³ .
HCFC-123	1.71	330	90	30	Negative.
HCFC-124	6.9	1500	440	150	Negative.
HFC-125	40.5	5200	3400	1200	None ³ .
HFC-134a	15.6	3100	1200	400	None ³ .
HCFC-141b	10.8	1800	580	200	Negative.
HCFC-142b	22.4	4000	1800	620	Negative.
HFC-143a	64.2	4700	3800	1600	None ³ .
HFC-152a	1.8	530	150	49	None ³ .
CCl ₄	47	1800	1300	480	Negative.
CH ₃ CCl ₃	8.1	360	100	34	Negative.
CF ₃ Br	77	5600	4900	2300	Negative.
CHCl ₃	0.7	92	25	9	Negative.
CH ₂ Cl ₂	0.8	54	15	5	Negative.
CO	Months—				Positive.
NMHC	Days-months				Positive.
NO _x	Days				Uncertain.

¹ An approximate lifetime is 120 years.

² CO₂ is not involved in chemical reactions affecting the concentrations of the radiatively active species. However, it could affect the relevant chemical reactions through its influences on the atmospheric thermal structure.

³ No currently known or negligible indirect effect.

To date no definitive set of relationships exists to compare differential radiative effects of greenhouse gases. DOE has not been able to identify a suitable method for accounting for differences among gases with respect to their contribution to radiative balance. DOE plans to rely on refinements produced by scientific research and on assessments of the IPCC. An issue in guideline development revolves around the appropriate way to fulfill, in the voluntary reporting program, the statutory requirement to address radiative forcing given the framework of the ongoing research, evolving scientific knowledge, and international scientific deliberation on this issue. The reporting program could require data to be reported by common units (for example, carbon dioxide equivalents), or it may be able to address the statutory requirement by issuing a reference document providing the current scientific consensus on this issue, for informational use by the reporting entity. Under this approach, all data would be reported in units of the GHG emitted/reduced or units of carbon sequestered, and not reduced to a common radiative forcing unit.

Emissions Reduction and Carbon Sequestration Activities

Section 1605(b)(1) states that the guidelines are to establish procedures for the accurate voluntary reporting of information on "annual reductions of greenhouse gas emissions and carbon fixation achieved through any measures." The subsection includes a list of technologies and practices that might be used to reduce emissions of greenhouse gases or sequester carbon. The statutory list was not exclusive. Data on additional activities may be reported under the voluntary reporting system, and used by the reporter to demonstrate achieved reductions.

Where possible, DOE will provide specific guidance for each technology and practice on the calculation of emissions, emissions reductions, and carbon sequestration accomplishments. General, generic guidance will be necessary for activities not covered by a specific guideline.

DOE has identified five major sectors in which GHG emissions and carbon sequestration are likely to occur: electric utility, residential and commercial, industrial, transportation, and agriculture and forestry sectors.

Electric Utility Sector

Electricity generation is a major contributor to total U.S. CO₂ emissions. With a potential reporting population of over 2,000 fossil fuel generating units operated by approximately 300 utilities, this sector may require special attention in the voluntary reporting program. Four major activity groups in this sector cover most areas of reduction of GHG emissions: addition and replacement of generating capacity, maintenance and use of existing equipment, emissions abatement, and demand-side management.

As utilities add and replace generating capacity, they will have opportunities to significantly reduce GHG emissions. By increasing the capital turnover rate, utilities speed up the replacement of older, higher emitting generating plants with new technologies that have lower heat rates and higher conversion efficiencies. Turnover also allows utilities to substitute fuels with lower emissions, such as natural gas, for those with higher emissions, such as coal. Utilities can also adopt generating technology and fuel combinations that have low or no GHG emissions, such as nuclear, hydro, geothermal, wind, and solar technologies. GHG emissions can also be reduced by adoption of cogeneration technologies, that is, the joint production of electricity and useful heat from a single combustion process.

Utilities can also affect GHG emissions through their procedures for using, maintaining, and upgrading existing equipment. Both the rehabilitation and repowering of generation plants can lead to lower GHG emissions. Reducing transmission and distribution system losses and managing the generating mix can also indirectly result in reduced GHG emissions.

In addition, methods exist to capture CO₂ after it has been released by the combustion process. However, for economic reasons, pre-combustion fuel treatment technologies and direct post-combustion emissions controls are unlikely to play a significant role in emissions reductions in the foreseeable future.

During the past several years utilities have conducted a variety of demand-side management (DSM) programs intended to affect customer use of electricity and natural gas. DSM activities also have been undertaken by private conservation consultants and contractors. Measurement of both energy savings and emissions reductions under DSM programs

appears to be a complex task. In this area, DOE may design flexible guidelines that balance measurement costs against uncertainty of estimation techniques, similar to the EPA Conservation Verification Protocols recently adopted for use in the sulfur dioxide allowance program under the Clean Air Act. The issue of joint activities and the appropriate reporting entity also clearly presents itself with DSM activities.

Residential and Commercial Sector

The combined residential and commercial sectors are responsible for a significant share of U.S. CO₂ emissions. Within the residential sector, energy is consumed for space and water heating, air conditioning, lighting, and appliance operation. Space heating is the largest single use of energy in the commercial sector, followed by lighting, air conditioning and ventilation. Addressing the direct generation of GHG by sources in those sectors, through on-site combustion of fossil fuels for space or water heating, for example, raises the issue of threshold levels of reportable activity. Addressing indirect generation of GHG by electricity consumption in these sectors presents the additional issue of how entities allocate reportable data on emissions and reductions.

Energy use reductions leading to GHG emissions reductions can be achieved by several activities. For example, building practices for new residential and commercial structures may be adopted, including increased insulation in ceilings, walls, and floors; double or triple glazing in windows and sliding glass doors; reduced infiltration with the use of caulking and weather stripping; and increased insulation of pipes and duct work. The heating and cooling requirements of existing buildings can also be reduced significantly through retrofitting a wide variety of weatherproofing measures. In the commercial sector the energy used for heating and cooling during non-working hours has already been reduced in most buildings in the United States.

Using high efficiency appliances can also help to reduce GHG emissions in the residential and commercial sectors. High efficiency lighting and HVAC systems, high efficiency gas furnaces, and high efficiency standard and groundwater heat pumps can also lower GHG emissions. Solar space heating and hot water heating can also reduce or eliminate GHG emissions related to those services.

Additional areas for greenhouse gas (particularly methane) reduction activities are possible in the waste-related activities of these sectors, such as landfills, wastewater treatment, and sewage sludge disposal.

Industrial Sector

The majority of United States industrial fuel use, and a corresponding large share of industrial CO₂ emissions, are concentrated in eight industries. These industries are petroleum refining, chemicals, paper, steel, glass and stone, cement, transportation equipment, and aluminum. Because the processes within seven of these industries are relatively uniform, specific guidelines for emission reductions are possible. The chemical industry, however, has highly diverse manufacturing processes and does not present similar uniformity.

Industry uses energy primarily for process heat, mechanical power and electric drive, instrumentation and control, space heat, and light. Process heat can be conserved by waste heat recovery, process flow optimization improvements in combustion technologies, cogeneration, and preheating materials. Electric drive savings are possible through the use of improved motors and torque converters, clutched fly wheels, alternating current synthesizers, and robots. Energy efficiency in the area of instrumentation and control can be increased through the application of computer technology that allows improved metering of energy inputs to the production process. Space heating can become more efficient through improved use of insulation, use of waste heat, and more efficient HVAC equipment. Efficient illumination technologies and practices can also reduce energy use.

In addition, the industrial sector may achieve direct or indirect reductions in GHG emissions through fuel switching away from fossil or carbon-intensive fuels; increased recycling of materials such as aluminum, glass, and steel; and using less energy-intensive intermediate industrial products. Non-combustion processes, such as smelting of primary aluminum and cement manufacturing, may also offer opportunities for GHG emissions reductions. Substituting other building materials for cement may also result in a decrease in CO₂ emissions based on reduced cement production.

Energy extraction—coal mining, and oil and gas drilling—leads to significant releases of methane. Extraction processes also indirectly account for small amounts of GHG emissions from the use of combustion engines, compressors, and pumps. Coalbed methane emissions may be reduced by

capture, flaring, or other technologies and practices. Emissions of methane can be reduced by repairing leaks in natural gas pipelines. However, data related to these emissions are not as precise as those for emissions from the combustion of fossil fuels.

Although the role of halogenated compounds in the greenhouse effect is uncertain, the statutory language includes addressing emissions reductions of CFC. Halogenated or other substances with lower radiative forcing potential may be substituted for substances with higher potential. The guidelines may need to distinguish between CFCs and other halogenated substances that are released as a by-product of manufacturing and those that are incorporated into a final product creating the potential for subsequent release.

Transportation

While vehicle operations are the most obvious source of GHG emissions from the transportation sector, construction of infrastructure, manufacture of vehicles, and production of fuels are also significant sources of emissions. Vehicle operation, a major fossil-fuel consumer, emits not only CO₂, but also NO_x, a possible precursor to N₂O. Within the area of vehicle operation the guidelines may address activities related to fuel use, fuel choice, and demand for transportation.

Fuel use in individual transportation may be reduced by the design, production, marketing, and purchase of vehicles with high fuel economy. Improved operation and maintenance practices, particularly among fleet owners, can also reduce emissions of greenhouse gases. Finally, programs and practices that promote replacement of less efficient vehicles and disposal of CFC refrigerants in mobile air conditioning units in accord with the Clean Air Act can also play a role in GHG emissions reductions. Substitution of halogenated substances by other compounds can also play a role.

Transportation fuels such as hydrogen, natural gas, methanol, and ethanol emit smaller quantities of greenhouse gases than petroleum fuels. Electricity emits no greenhouse gases at the point of use. Guidelines on fuel switching might provide provisions to calculate the net effect of switching from traditional to other transportation fuels, reflecting the effect upon the combined production and consumption system.

Programs to reduce the demand for certain types of transportation services may also contribute to the reduction of greenhouse gases. Most of what is

understood about transportation demand involves mode choice rather than the decision or need to travel. The greatest potential for voluntary emissions reductions achieved within this area lies in the substitution of low emission modes of transportation, such as high occupancy vehicles and public transit, for the use of one and two passenger automobiles.

The guidelines may treat transportation-related petroleum refining, vehicle manufacturing, and cement making as processes in the industrial sector.

Agriculture and Forestry Sector

The forestry and agricultural sectors not only present opportunities to reduce GHG emissions but also have potential to remove carbon from the atmosphere and store it in biomass and soil organic carbon, a process known as carbon sequestration. The activities in these sectors that could reduce GHG emissions and sequester carbon vary widely. They include new and replacement tree planting, modified forest management practices, biomass plantations, agroforestry, and agricultural practices and related industries.

Newly established forest stands sequester carbon and reduce atmospheric carbon dioxide levels. Similarly, the management of existing forests can be modified to increase the rate of carbon fixation. Two issues related to forestry activities are quantification of carbon sequestration and the long-term fate of carbon.

The carbon sequestration effects of forestry projects could be estimated by initial and periodic field measurements or from U.S. Forest Service data. For tree planting, sufficient data may exist on the growth rates of forest stands, the density and distribution of carbon in trees, and the carbon content of the balance of the forest ecosystem to allow prediction of carbon sequestration patterns for specific sites. However, because of wide variations in the characteristics of forest land and forest management techniques, estimating increased sequestration that results from modified forest management practices may require periodic field measurements.

The temporary nature of carbon sinks raises two issues peculiar to forestry. First, the guidelines may need to address the issue of projects reported in the database, but later harvested or accidentally destroyed. Second, new forest projects may have secondary effects on the management of existing forests; for example, by encouraging early harvesting of existing timber

stands and discouraging replanting of these stands.

The woody biomass energy crops also serve as a temporary carbon sink. This temporary sequestration could be treated in much the same way as the short-lived carbon sinks in shorter rotation timber stands. As with herbaceous energy crops, once woody biomass energy crops are harvested they serve to displace fossil fuels and their carbon emissions.

Agroforestry combines annual or perennial cropping systems with silviculture on the same tract of land. The emphasis on the use of woody crops is to utilize the available rain-fed moisture and provide dual products, agricultural and forest. Agroforestry may provide carbon sequestration in the woody biomass as well as increase soil organic carbon, since soil stabilization, and often no-till cropping, are combined with woody plants.

This may sequester more carbon per hectare (acre) than other no-till agricultural systems.

The agriculture sector is responsible for some emissions of carbon dioxide and significant emissions of methane and nitrous oxide. Domestic ruminant livestock production and rice production result in methane emissions. The production of feed grains, whether for domestic meat production or export, contributes indirectly to emissions of carbon dioxide and nitrous oxide through the consumption of energy and fertilizer used. GHG emissions may be lowered by improving livestock management systems, and the improved handling of manure and other wastes. Improved efficiency in breeding may also reduce emissions. Use of naturally occurring hormones is under review by agricultural producers and the consuming public.

Changes in cropland management practices and reduced burning of agricultural wastes could also reduce GHG emissions. Changes in the application and management of the biological conversion process of chemically-derived nitrogen fertilizer may reduce nitrous oxide emissions. More efficient production of chemical fertilizers, and the development of manufactured coatings to release nitrogen when growing plants can best utilize them, it will aid in the reduction of field-released nitrous oxide. Irrigation agriculture, where sprinkler systems are used to apply water, or pumping systems used to raise water and deliver it to fields where surface irrigation systems distribute the water, consume large amounts of energy. Improved irrigation systems utilizing the newer

technologies, or the development of new technologies, may conserve energy.

[FR Doc. 93-17878 Filed 7-26-93; 8:45 am]

BILLING CODE 6450-01-P

Implementation of Noncompetitive Financial Assistance

AGENCY: U.S. Department of Energy (DOE), Nevada Operations Office (DOE/NV).

SUMMARY: DOE announces that pursuant to the DOE Financial Assistance Rules, 10 CFR 600.14(e)(1), it intends to award a noncompetitive financial assistance grant to the state of Alaska to improve the accountability of DOE in the areas of environmental protection and public health and safety.

This award will provide funds to chart a new course for DOE toward full accountability in the areas of environmental protection and public health and safety.

PROJECT SCOPE: The state of Alaska will provide independent oversight and validation of environmental remediation activities at the Project Chariot site, Cape Thompson, Alaska.

The state of Alaska will assume a substantive role in overseeing DOE's compliance with state environmental laws, and help to assure the citizens of Alaska that DOE operations do not constitute a health hazard.

Eligibility for the award of this grant is being limited to the state of Alaska because the applicant is a unit of government, and the activity to be supported is related to performance of a governmental function within the subject's jurisdiction, thereby precluding DOE provisions of support to another entity.

The project period of this grant is for two years, and the grant will commence August 1, 1993, and end July 31, 1995. The total established cost of this award is \$500,000.

FOR FURTHER INFORMATION CONTACT: U.S. Department of Energy, Nevada Operations Office, ATTN: Stephen A. Mellington, P.O. Box 98518, Las Vegas, NV 89193-8518.

Issued in Las Vegas, Nevada on July 15, 1993.

Nick C. Aquilina,

Manager, DOE Nevada Operations Office.

[FR Doc. 93-17873 Filed 7-26-93; 8:45 am]

BILLING CODE 6450-01-M

Federal Assistance Award to Golden Technologies Co., Inc.

AGENCY: Department of Energy.

ACTION: Notice of noncompetitive financial assistance award.

SUMMARY: The U.S. Department of Energy (DOE), pursuant to the DOE Financial Assistance Rules, 10 CFR 600.7, is announcing its intention to enter into a cooperative agreement with Golden Technologies Company Inc. to continue a project initiated with ALCOA for development of high temperature catalytic membrane reactors.

ADDRESSES: Questions regarding this announcement may be addressed to the U.S. Department of Energy, Golden Field Office, 1617 Cole Blvd., Golden, Colorado 80401, Attention: M.A. Barron, Contract Specialist. The Contracting Officer is Paul K. Kearns.

SUPPLEMENTARY INFORMATION: Golden Technologies Company Inc. (GTC) proposed to continue a project initiated by ALCOA under DOE cooperative agreement *DE-FC07-88ID12778. The project involves high temperature ceramic membranes, a specialty of GTC, configured to retain catalytic materials. Feedstocks are introduced and reactions occur by virtue of the presence of the catalysts. The membranes allow certain products to leave the reaction zone and retain others. In this way reactions occur faster, at lower temperature, proceed to higher percentages of completion, etc.

The activity to be funded is necessary to the satisfactory completion of, and is a continuation of, an activity presently being funded by DOE, and for which competition for support would have a significant adverse effect on continuity and satisfactory completion of the activity. Also, the applicant has exclusive domestic capability to perform the activity successfully based upon their relationship with their principal subcontractor, M&P, who has the proprietary information, and technical expertise gained in the earlier phases of the project.

The project is estimated to cost \$6,000,000. The proposed DOE cost share is \$3,977,000 over the expected four year project period.

Issued in Chicago, Illinois, on July 2, 1993.

Mike Kainrath,

Chief, Policy Branch, Contracts Division.

[FR Doc. 93-17874 Filed 7-26-93; 8:45 am]

BILLING CODE 6450-01-M

Award of a Cooperative Agreement, Noncompetitive Financial Assistance

AGENCY: U.S. Department of Energy (DOE), Nevada Operations Office (DOE/NV)